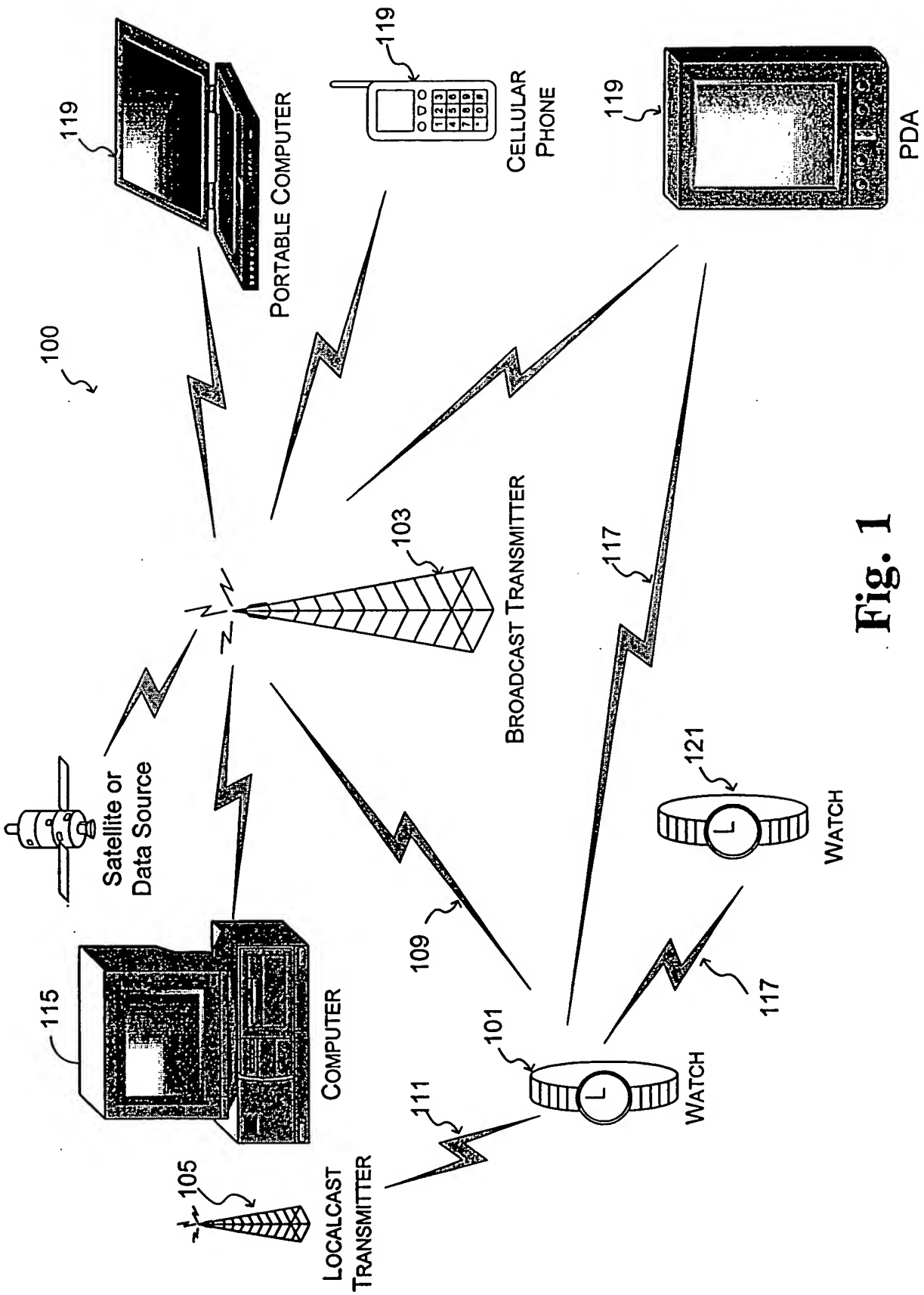

100
119
PORTABLE COMPUTER
119
CELLULAR PHONE
119
PDA
103
BROADCAST TRANSMITTER
117
Satellite or Data Source
121
WATCH
109
115
COMPUTER
101
WATCH
117
111
105
LOCALCAST TRANSMITTER

Fig. 1

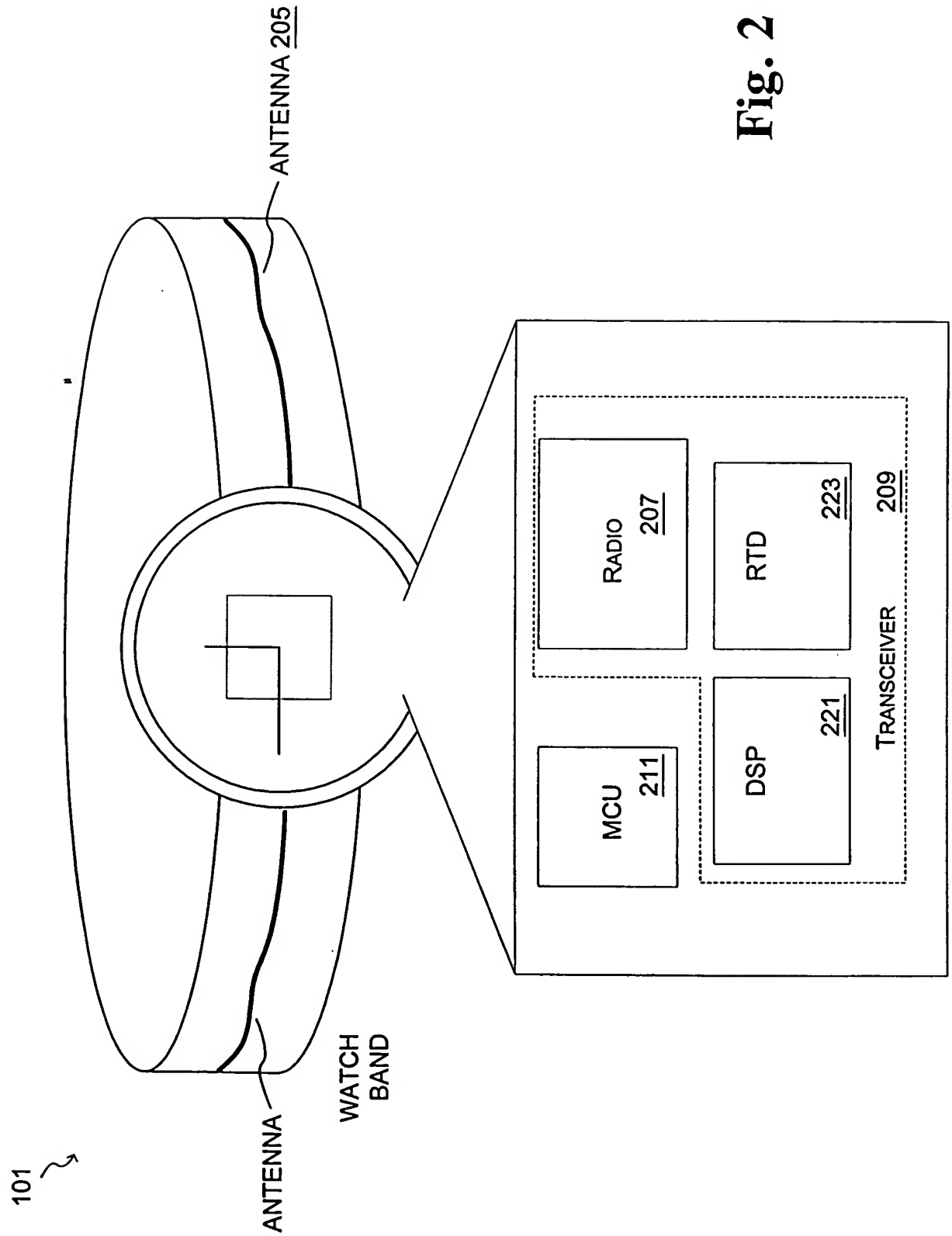

ANTENNA 205
RADIO 207
RTD 223
TRANSCEIVER 209
MCU 211
DSP 221
WATCH BAND
ANTENNA
101

Fig. 2

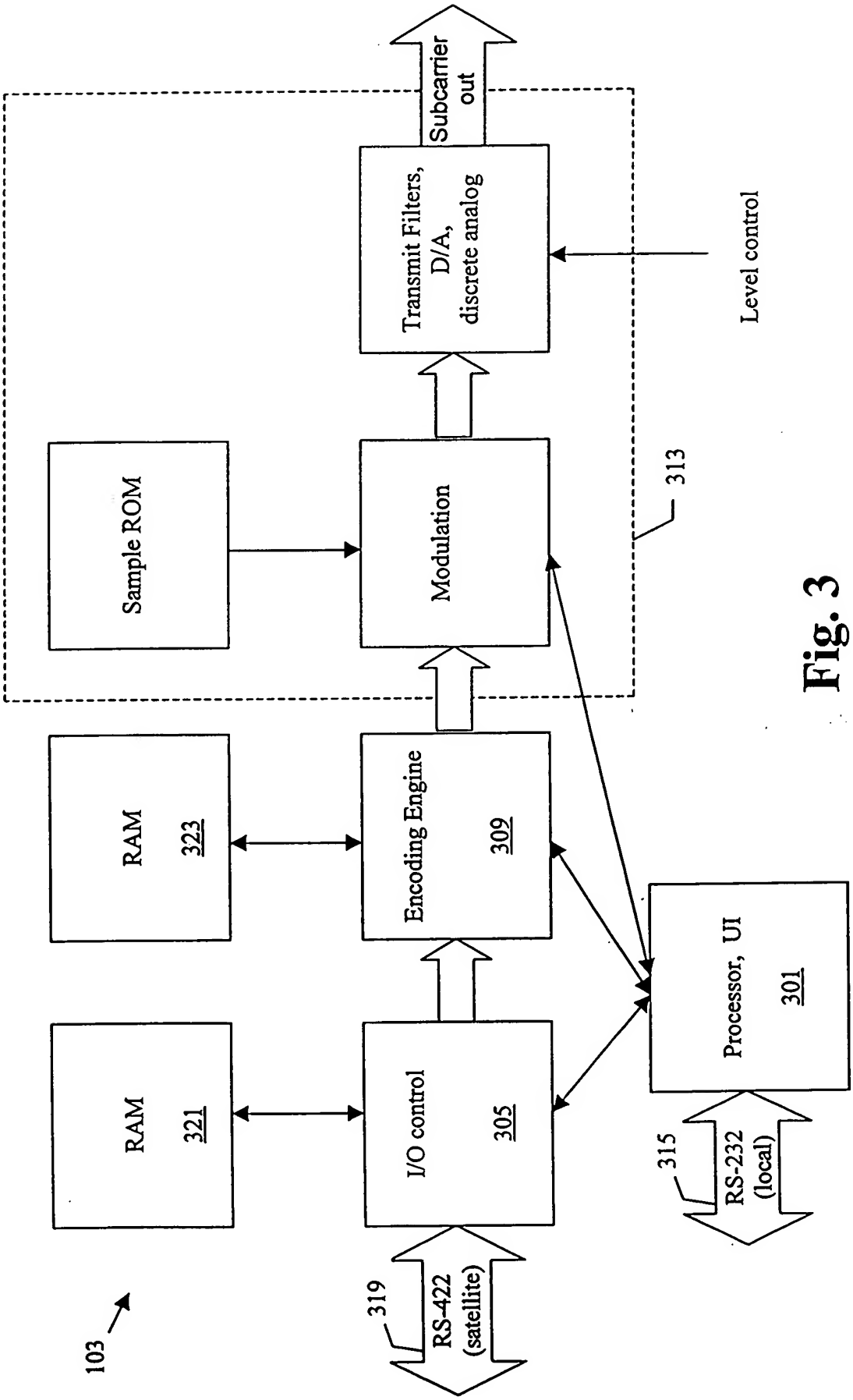

Subcarrier out
Transmit Filters, D/A, discrete analog
Level control
Sample ROM
Modulation
313
RAM 323
Encoding Engine 309
Processor, UI 301
RAM 321
I/O control 305
315
RS-232 (local)
319
RS-422 (satellite)
103

Fig. 3

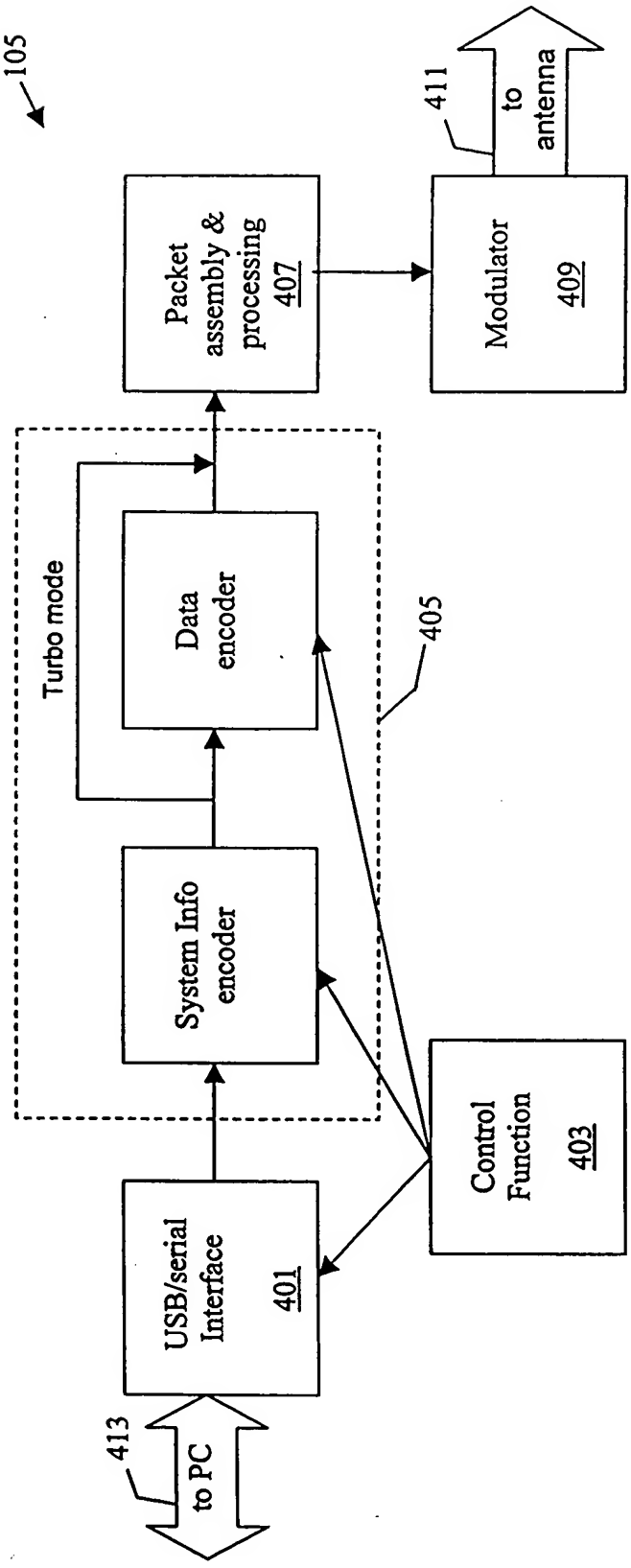

105
411
to antenna
Packet assembly & processing 407
Modulator 409
Turbo mode
Data encoder
405
System Info encoder
Control Function 403
USB/serial Interface 401
413
to PC

Fig. 4

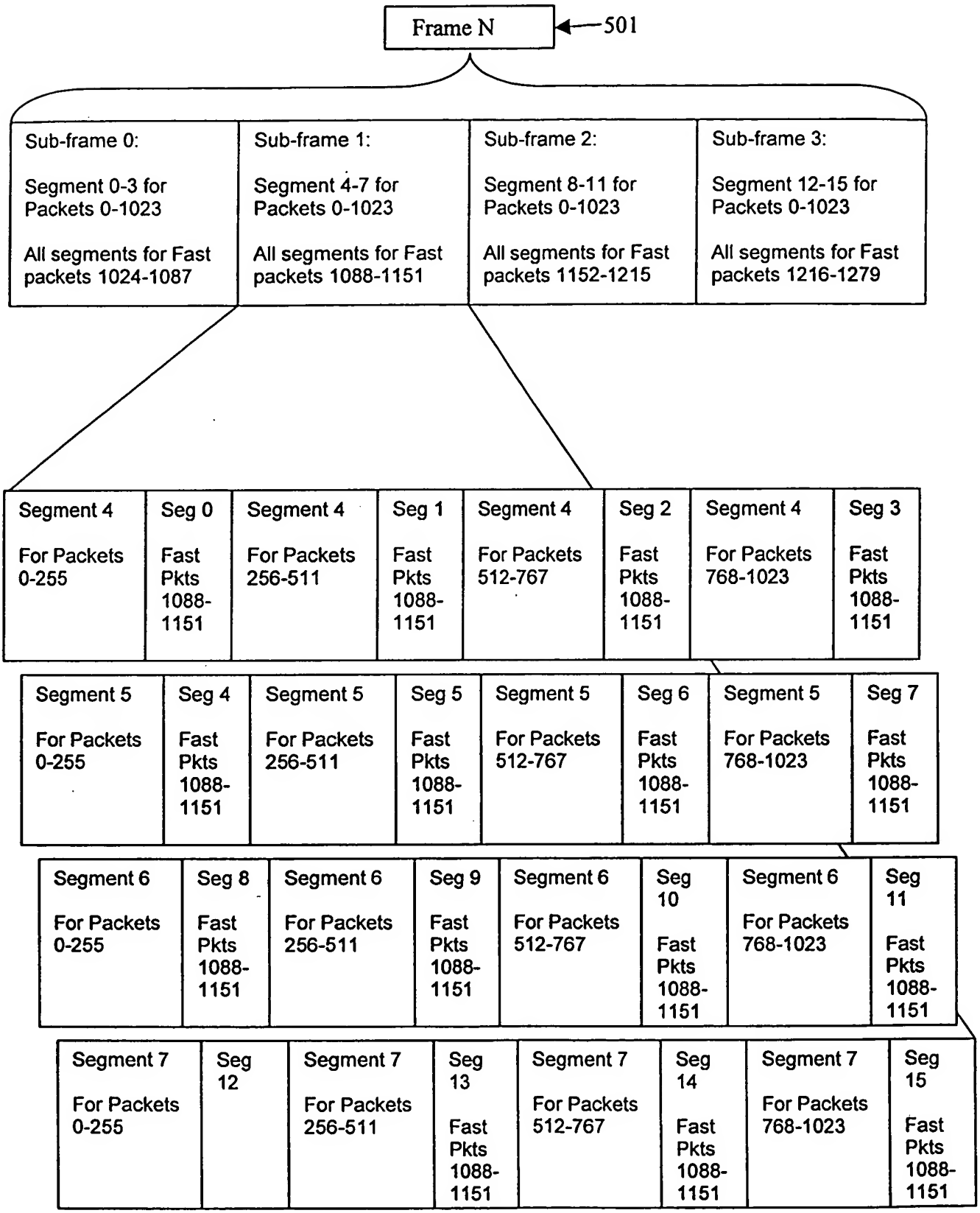

Frame N
501
Sub-frame 0:
Segment 0-3 for Packets 0-1023
All segments for Fast packets 1024-1087
Sub-frame 1:
Segment 4-7 for Packets 0-1023
All segments for Fast packets 1088-1151
Sub-frame 2:
Segment 8-11 for Packets 0-1023
All segments for Fast packets 1152-1215
Sub-frame 3:
Segment 12-15 for Packets 0-1023
All segments for Fast packets 1216-1279
Segment 4 For Packets 0-255
Seg 0 Fast Pkts 1088-1151
Segment 4 For Packets 256-511
Seg 1 Fast Pkts 1088-1151
Segment 4 For Packets 512-767
Seg 2 Fast Pkts 1088-1151
Segment 4 For Packets 768-1023
Seg 3 Fast Pkts 1088-1151
Segment 5 For Packets 0-255
Seg 4 Fast Pkts 1088-1151
Segment 5 For Packets 256-511
Seg 5 Fast Pkts 1088-1151
Segment 5 For Packets 512-767
Seg 6 Fast Pkts 1088-1151
Segment 5 For Packets 768-1023
Seg 7 Fast Pkts 1088-1151
Segment 6 For Packets 0-255
Seg 8 Fast Pkts 1088-1151
Segment 6 For Packets 256-511
Seg 9 Fast Pkts 1088-1151
Segment 6 For Packets 512-767
Seg 10 Fast Pkts 1088-1151
Segment 6 For Packets 768-1023
Seg 11 Fast Pkts 1088-1151
Segment 7 For Packets 0-255
Seg 12
Segment 7 For Packets 256-511
Seg 13 Fast Pkts 1088-1151
Segment 7 For Packets 512-767
Seg 14 Fast Pkts 1088-1151
Segment 7 For Packets 768-1023
Seg 15 Fast Pkts 1088-1151

Fig. 5

MODIFIED HDLC FRAME FORMAT

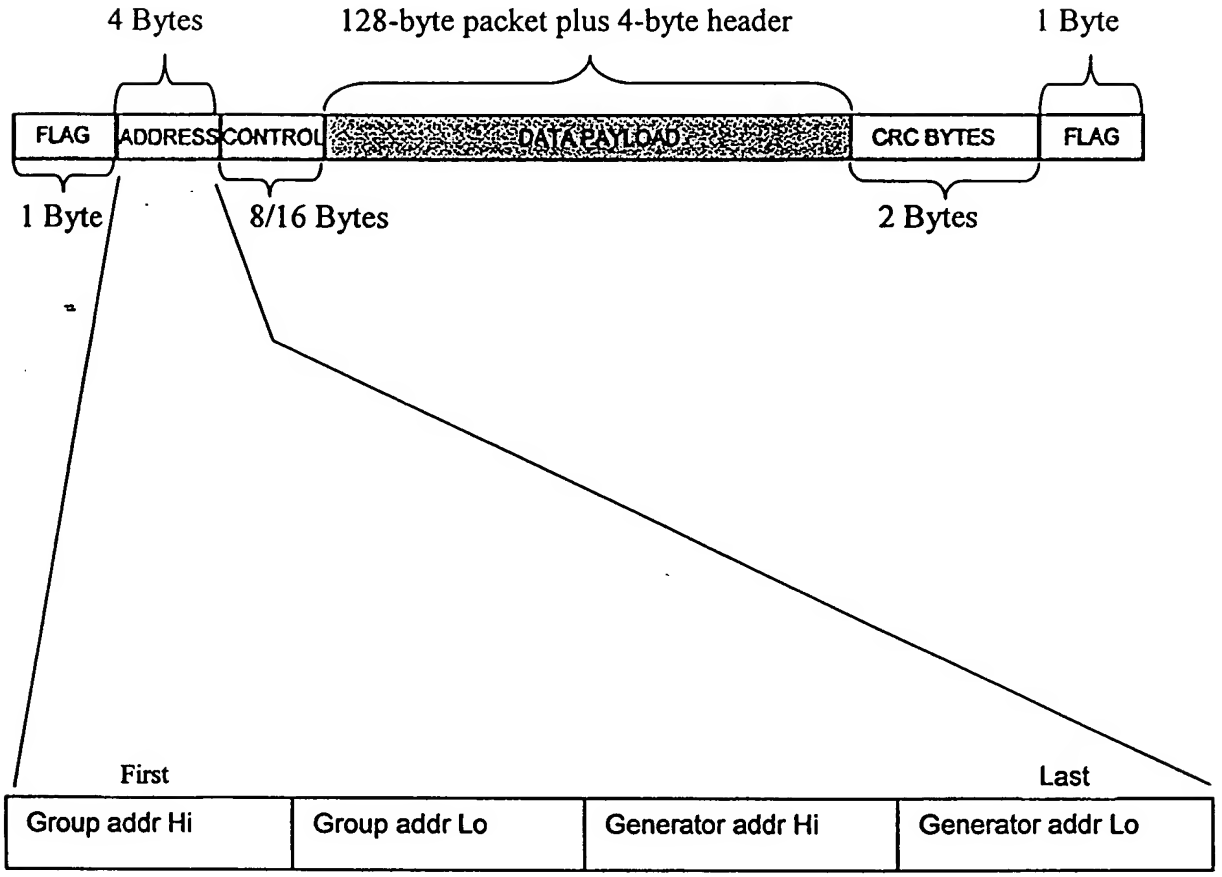


Fig. 6

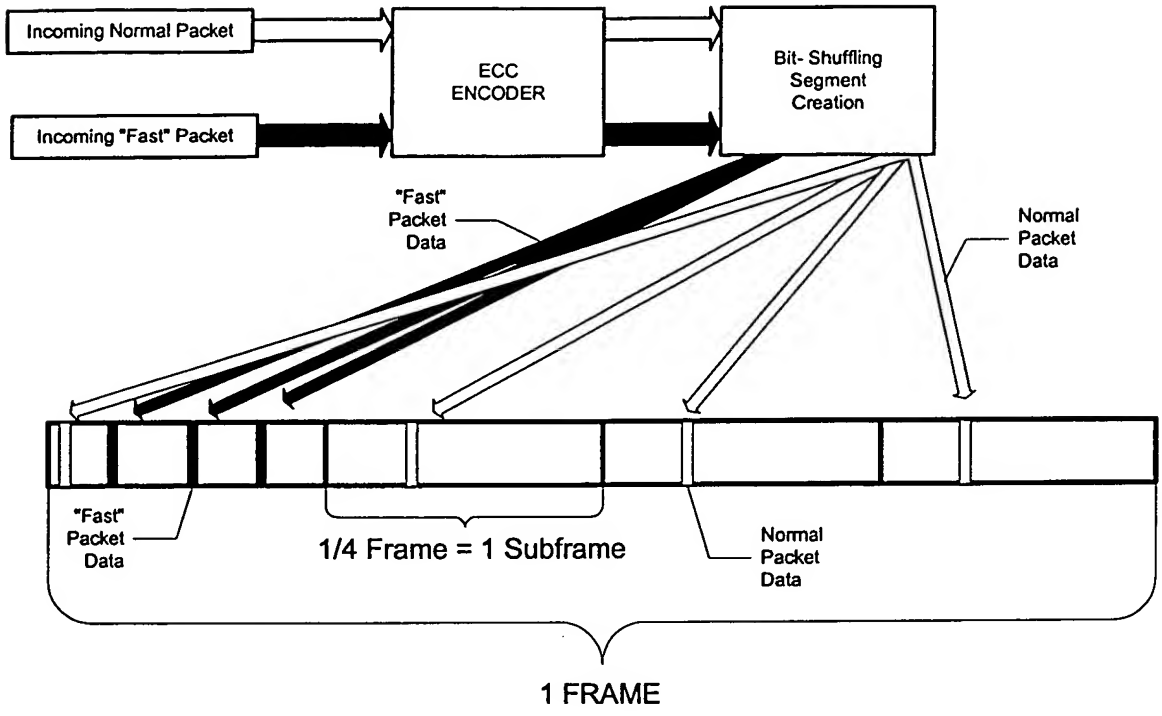

Incoming Normal Packet
Incoming "Fast" Packet
ECC ENCODER
Bit- Shuffling Segment Creation
"Fast" Packet Data
Normal Packet Data
"Fast" Packet Data
1/4 Frame = 1 Subframe
Normal Packet Data
1 FRAME

Fig. 7

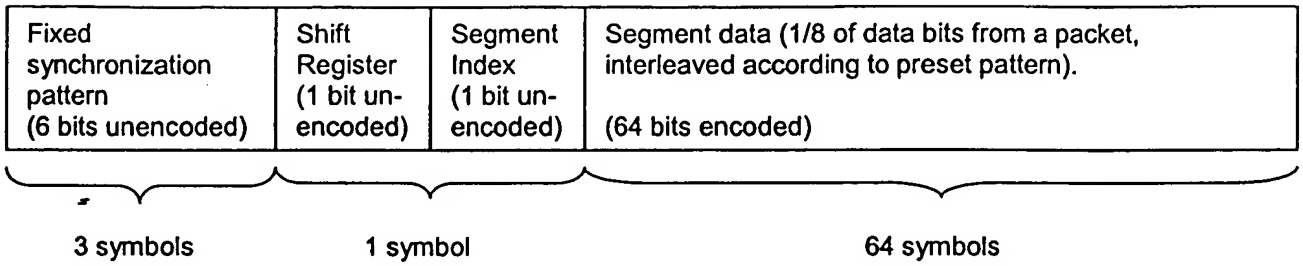
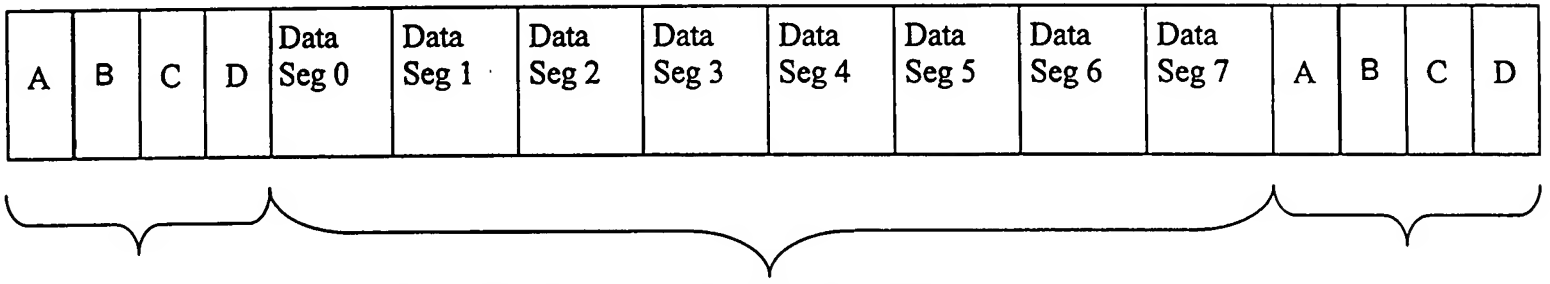

Fixed synchronization pattern (6 bits unencoded)
Shift Register (1 bit un-encoded)
Segment Index (1 bit un-encoded)
Segment data (1/8 of data bits from a packet, interleaved according to preset pattern).
(64 bits encoded)
3 symbols
1 symbol
64 symbols

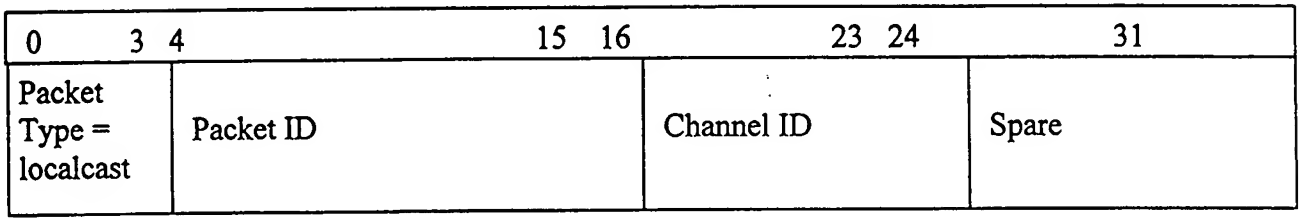
Fig. 8



Correlation sequence 64 symbols

Eight segments, each of 64 data bits, interleaved, and 4 system information bits, separately ½-rate encoded. (4*8*2)+(64*8*2) = 1088 FM symbols/packet

Correlation sequence 64 symbols



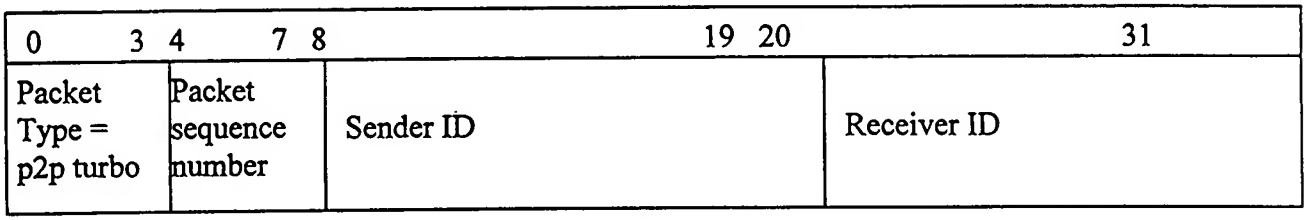


Fig. 9

Inventor: Karr, et al.
Docket No.: [illegible]'65USU1/177809.2
Title: SYSTE[illegible]ID APPARATUS FOR PERFORMING BROADCAST AND LI[illegible]CAST COMMUNICATIONS
Sheet 9 of 12

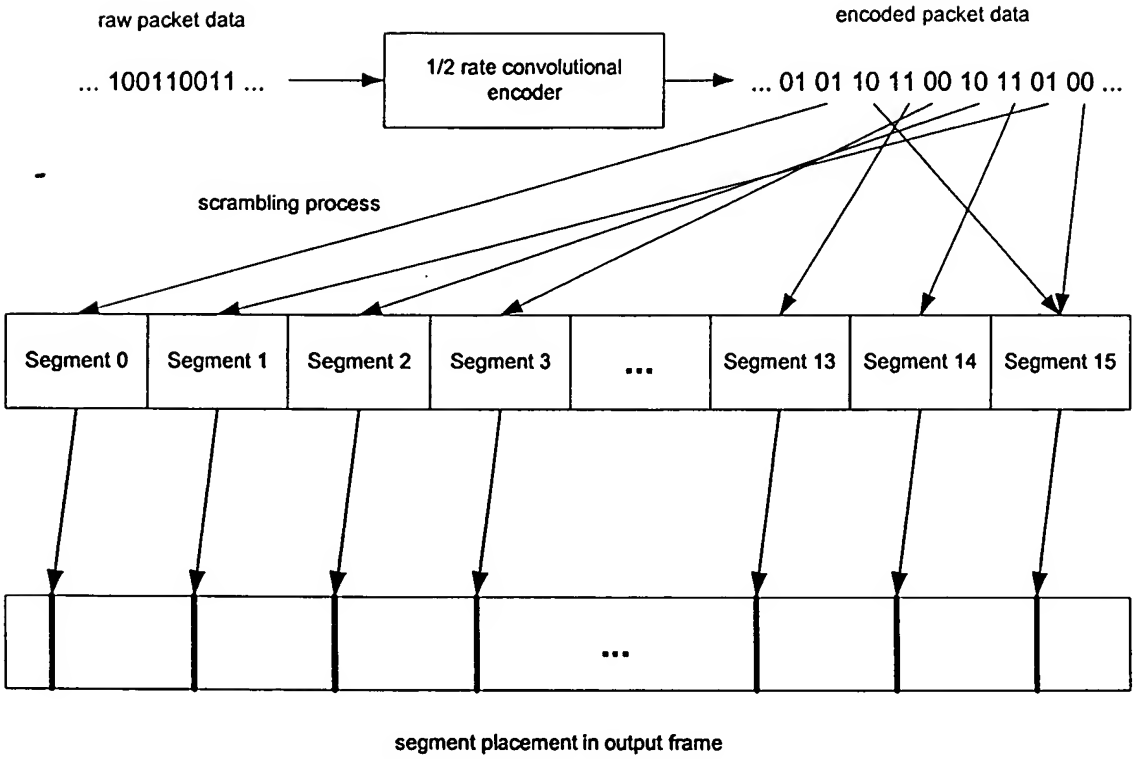

raw packet data
... 100110011 ...
1/2 rate convolutional encoder
encoded packet data
... 01 01 10 11 00 10 11 01 00 ...
scrambling process
Segment 0
Segment 1
Segment 2
Segment 3
...
Segment 13
Segment 14
Segment 15
...
segment placement in output frame

Fig. 10

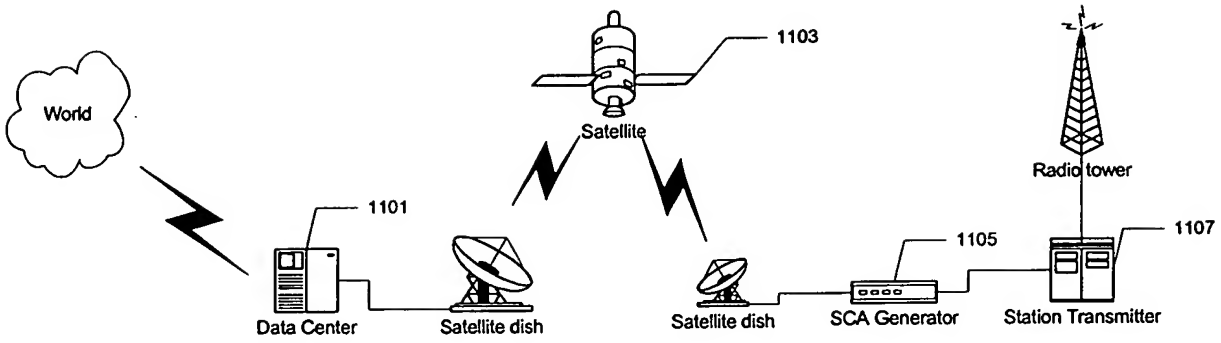

World
1103
Satellite
Radio tower
1101
1105
1107
Data Center
Satellite dish
Satellite dish
SCA Generator
Station Transmitter

Fig. 11

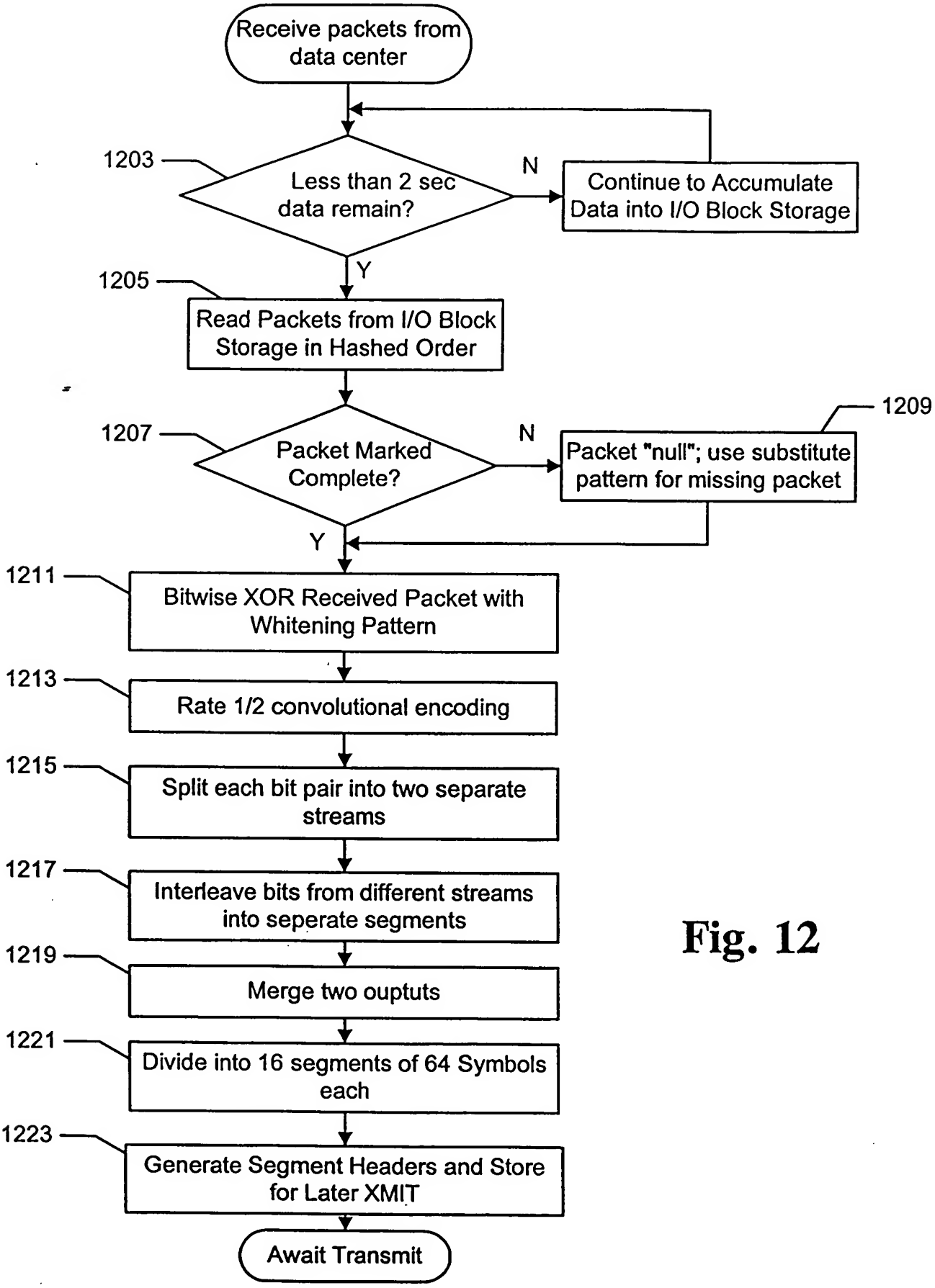

Receive packets from data center
1203
Less than 2 sec data remain?
N
Continue to Accumulate Data into I/O Block Storage
Y
1205
Read Packets from I/O Block Storage in Hashed Order
1207
Packet Marked Complete?
N
1209
Packet "null"; use substitute pattern for missing packet
Y
1211
Bitwise XOR Received Packet with Whitening Pattern
1213
Rate 1/2 convolutional encoding
1215
Split each bit pair into two separate streams
1217
Interleave bits from different streams into seperate segments
1219
Merge two ouptuts
1221
Divide into 16 segments of 64 Symbols each
1223
Generate Segment Headers and Store for Later XMIT
Await Transmit

Fig. 12